**Motion:**

Definitions:

1. Distance
2. Time
3. Speed
4. Average velocity
5. Instantaneous velocity
6. Constant velocity
7. Acceleration
8. Constant velocity
9. Average acceleration
10. Displacement
11. Uniform motion

Problems:

1. A bird flies from its nest to a nearby building and then halfway back. If there exists 60 m between the building and the nest find …
   1. The distance b. The displacement
2. Explain the following graphs.
   1. b.   
        
      d (m) d (m)  
        
        
       t (s) t (s)
3. If a leopard runs at a constant velocity of 4.5 m/s for 5 minutes before stopping for a drink of water, what is the displacement of the leopard?
4. A whale swims at a velocity of 4 m/s (NE) until it sees its prey. The whale accelerates to 7.5 m/s. If it take 6 s to reach the prey, what was the displacement between the whale and the prey?
5. A NASCAR driver must hit the breaks to avoid a collision. He decelerates to a velocity of 9 m/s. If the car traveled 60 m after he hit the breaks in 5.5 s, what was the original velocity of the car?
6. A sled is sliding down a hill. At the top of the hill the sled is traveling with an initial velocity of 2 m/s. After sliding down the 70 m long hill the sled is travelling at a velocity of 4 m/s. How long did it take the sled to reach the bottom of the hill?
7. Krista has decided to go sky diving. Krista jumps from the plane and begins her decent traveling at a velocity of 6 m/s. 5.5 minutes later Krista pulls her chute. If Krista traveled 5 km in this time period what is her velocity at this point?
8. A woman runs with a constant acceleration of 0.3 m/s2 until she reaches a velocity of 2.3 m/s. How long would it take her to reach her final velocity?
9. A moth rest on the window. The moth leaves the window with an acceleration rate of 0.2 m/s2 for 2 seconds. Find the final velocity of the moth.
10. A fly accelerates at a rate of 0.2 m/s2 after being swatted by a fly swatter. How long would it take the fly to change velocity from 0.33 m/s to a final velocity of 0.78 m/s?
11. Jess is trying to catch his goldfish that is traveling at a velocity of 0.02 km/h. Jess begins his chase from a velocity of 1.0 m/s and accelerates at a rate of 0.31 m/s2 for 7.4 s. What was Jess’s final velocity? Will Jess catch his fish?
12. A car traveling at a velocity of 30 m/s slams on its breaks and slides for 10 s before coming to a stop. Calculate the acceleration rate of the car.
13. How long would it take a truck to change its velocity from 12 m/s to 20 m/s if it was accelerating at a rate of 2.3 m/s2?
14. Sarah is running around a circular track. The length of the track is 1.3 km. Sarah after warming up can complete one lap around the track in 4 minutes. Sarah’s final velocity on this lap was 5.4 m/s. What was Sarah’s initial velocity?
15. A car is traveling at 21 m/s before stopping 19 m later at a red light. Calculate the acceleration of the vehicle.
16. Logan is driving his motorcycle with a velocity of 10 m/s prior to reaching the highway. Going up the on ramp to the highway Logan accelerates at a rate of 2.4 m/s2. How far would Logan travel before he reached a velocity of 40 m/s?
17. Jody was walking down the street with a velocity of 1.3 m/s until she meets a viscous dog. To escape the dog Jody ran 6 m while constantly accelerating at a rate of 0.3 m/s2. What was Jody’s final velocity?
18. Why is the acceleration sometimes negative?
19. Convert the following to m/s
    1. 89 km/h b. 2.3 m/min

***\* Also go over the examples and information on displacement-time graphs***

**Ecology**

Definitions:

1. Artificial ecosystem
2. Natural ecosystem
3. Tropic levels
4. Consumer
5. Producer
6. Autotroph
7. Heterotroph
8. Decomposer
9. Herbivore
10. Carnivore
11. Omnivore
12. Biotic
13. Abiotic
14. Sustainable ecosystem
15. Food chain
16. Photosynthesis
17. Cellular Respiration
18. Carbon Cycle
19. Nitrogen Cycle
20. Adaptations (the three types)

Concepts:

You have just been hired by the Kennebecasis Watershed Restoration Committee to extensively study the local Wood Turtle Population. It has been noted that the population of the turtle in the area has been in decline over the past 20 years.

1. Before you can begin this study you must first gain a deeper understanding of the wood turtle. Using the provided information construct:
   1. A food web to represent the interconnections between the wood turtle and the local environment.
   2. A fully labeled energy pyramid to represent the flow of energy through the ecosystem. Assume that 15 000 kcal of energy is initially entering the ecosystem.
2. You have been asked to survey the local watersheds with a focus on the local rivers and ponds, to determine the health of these ecosystems. Devise a plan action, a proposal, for how you would monitor the watersheds. Include information such as:

* Factors that would indicate that a river and or pond is in good health.
* Factors that would indicate that a river and or pond in in poor health.
* Indications of the sustainability of the water source.
* Possible deterrents to the establishment of a wood turtle population.
* Biodiversity levels

1. Based on your survey you have discovered that the local watersheds are in need of protection and repair if the wood turtle species is to thrive. You have found that many of the rivers, especially those that are near farms, have high nitrogen concentration within the water. In the summer some of the ponds dry up and the local rivers are used for recreational purposes (boating, fishing, swimming…). Devise a plan that the KWRC could enact to address these issues. Within your proposal be sure to use words or address topics such as:
   1. Bioaccumulation
   2. Bioamplification
   3. Succession
   4. Nitrogen cycle

**Chemistry**

Definitions:

1. Fusion
2. Fission
3. Valence Electrons
4. Reactant
5. Products
6. Acid
7. Base
8. pH Scale
9. Neutralization

Theories:

* Aufbau’s principle
* Pauli exclusion principle
* Hund’s rule
* Conservation of mass

Concepts:

1. Complete the following Table:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Element Name** | **Element Symbol** | **Atomic Number** | **Atomic Weight** | **Period** | **Group** | **State** | **Family** | **Number of Neutrons** | **Number of Electrons** | **Number of Protons** |
| Calcium |  |  |  |  |  |  |  |  |  |  |
|  |  | 38 |  |  |  |  |  |  |  |  |

1. Name and classify the following compounds:
2. H2O
3. NO2
4. Ba3N2
5. ZnO
6. Ti3­N2
7. CrSO4
8. H3PO4
9. HCl
10. HClO2
11. Co(OH)3
12. NaOH
13. Classify and write the formulas for the following compounds:
14. Diphosphorus trichloride
15. Carbon monoxide
16. Lithium oxide
17. Sodium phosphate
18. Iron (II) oxide
19. Lead (III) nitrate
20. Calcium hydroxide
21. Manganese (II) hydroxide
22. Nitric acid
23. Hydrobromic acid
24. Nitrous acid
25. Balance the following chemical reactions:
26. K2O + H2O → KOH
27. H2O2 → H2O + O2
28. Al + O2 → Al2O3
29. Al + S8 → Al2S3
30. Al(OH)3 + HBr → AlBr3 + H2O
31. Al(OH)3 + H2CO3 → Al2(CO3)3 + H2O
32. Dicarbon dihydride combines with oxygen gas to produce carbon dioxide and water.
33. Carbon and water combine to create carbon monoxide and hydrogen gas.
34. Potassium chlorate disassociates to create potassium perchlorate and potassium chloride.
35. Rubidium combines with rubidium nitrate to crate rubidium oxide and nitrogen gas.
36. Reaction Identification: Identify the reactions from the previous question.
37. Draw a Lewis Structure for:
38. Carbon
39. Selenium
40. Oxide
41. Calcium ion
42. Construct a Bohr-Rutherford Diagram for:
43. Fluorine
44. Magnesium ion
45. Electron Configuration:
46. Standard Notation
47. Bromine
48. Platinum
49. Beryllium ion
50. Fluoride
51. Short-Hand Notation
52. Gold
53. Arsenic
54. Iodide
55. Cesium ion
56. Orbital Diagrams:
57. Sodium
58. Aluminum
59. Predict the product created from the fusion of:
60. Praseodymium and Lithium

**Weather**

Definitions:

1. Latent Heat
2. Specific Heat
3. Hydrological Cycle
4. Hydrosphere
5. Convection
6. Conduction
7. Radiation
8. Precipitation

Concepts:

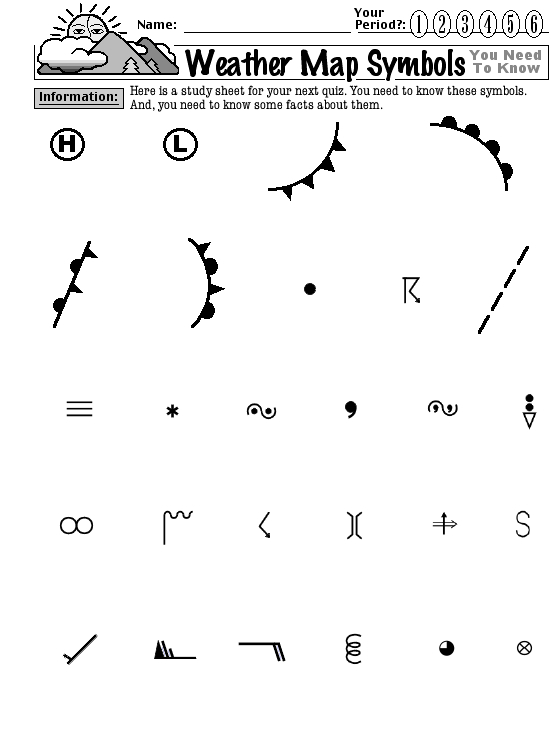
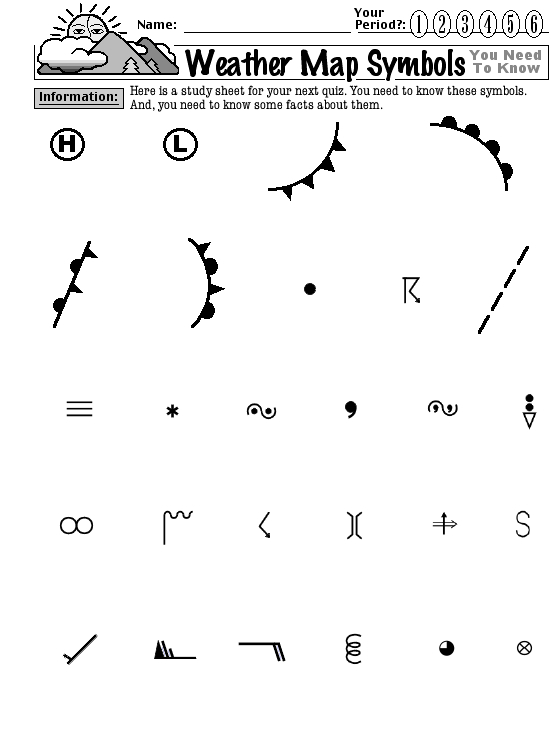
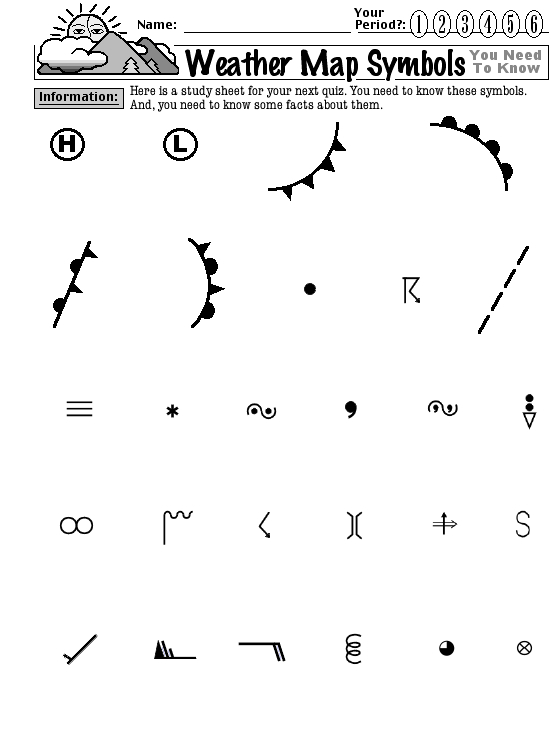
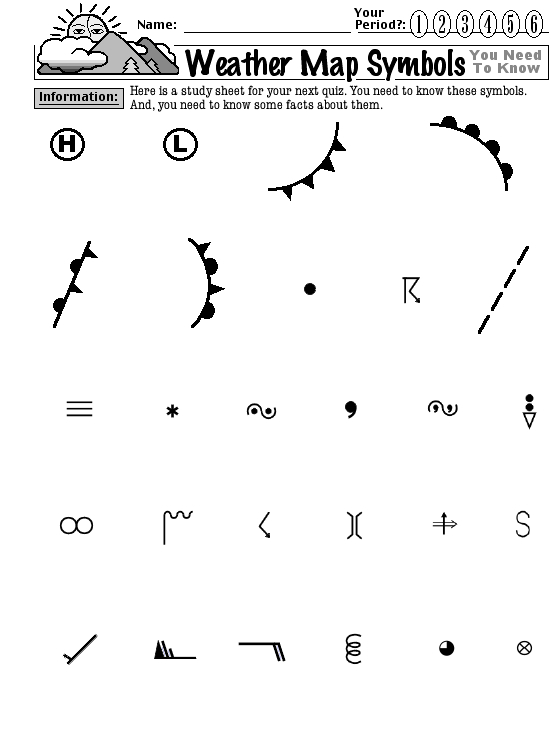
1. Arrange the following from highest to lowest Albedo. Remember Albedo is the measure of radiation reflected from the objects surface.  
    Snow, Grass, Black Pavement, Potting Soil
2. How does living by a large body of water, in the Maritimes, influence the temperatures in winter and summer?
3. Explain why it is important to consider salt water when one is studying weather.
4. Why do we consider icebergs to be fresh water?
5. Draw and label a diagram of the water cycle.
6. Two 15 g pieces of metal (A and B) are left in the sun for 3 hours. Metal A has a specific heat capacity of 2.5 J/g°C while Metal B has a specific heat capacity of 1.8 J/g°C.  
   1. Which metal will be the warmest after 3 hours? Explain.
   2. Which metal would be the best heat sink? Explain.
7. Explain the role of conduction, convection, and radiation in weather.
8. Three containers of equal size and composition, as described below, were filled with hot coffee.

- Dull Metal

* Shiny metal
* Dull black  
  1. Which container would be the warmest after ten minutes?
  2. If the containers were placed equidistance from a heater which one would be the warmest after ten minutes?

1. Complete the following table

|  |  |  |  |
| --- | --- | --- | --- |
| **Type of Front** | **How it Forms** | **Weather it Brings** | **Symbol Used to Represent the Front on a Weather Map** |
| Cold Front |  |  |  |
| Warm Front |  |  |  |
| Stationary Front |  |  |  |
| Occluded Front |  |  |  |

1. Decipher the following weather map symbols.
   1. 
   2. 
   3. 
   4. 

Calculations:

1. A 10 g piece of iron absorbs 2000 J of heat energy causing its temperature to change from 30°C to 50°C. Calculate the specific heat capacity of the iron.
2. Calculate the amount of heat energy required to raise the temperature of 10 g of aluminum from 20°C to 30°C, if the specific heat capacity of aluminum is 1.80 J/g°C.
3. Calculate the final temperature of 10 g piece of glass if it absorbs 3000 J of heat energy and it has a specific heat capacity of 0.70 J/g°C. The initial temperature of the glass is 20°C
4. What is the mass of a piece of copper that has a specific heat capacity of 2.5J/g°C and changed its temperature by 30°C when 5000 J of heat energy is applied?